

## PATENT SPECIFICATION



Inventor: ROLLO-GILLESPIE WILLIAMS.

640.693

Date of filing Complete Specification: March 1, 1946.

Application Date: March 3, 1945.

No. 5350/45.

Index at :

## ERRATA

SPECIFICATION No. 640,693.

Page 4, line 11, for "light" read  
"lighting"  
Page 4, line 68, after "decorative"  
delete "work"

THE PATENT OFFICE,  
25th September, 1950.

W  
Briti  
Notti  
of th  
5 Th  
the  
plurr  
proj  
incl  
10 and  
of n  
for  
clud  
may  
15 color

Means may be provided for varying the intensity of light emitted from the light source or each light source and/or means may be provided for varying the colour medium or media through which the light passes. It is preferred to employ electric lights and if means are provided for varying the intensity of light emitted such means functions to control the voltage applied to the light such as by the use of resistances, chokes, dimmers or the like.

One of the objects of the invention is to provide control means for apparatus of the said type which are particularly suitable for stage lighting but it will be appreciated that the invention is not limited to this specific purpose and may be utilised for other purposes.

The invention provides in or for a colour lighting apparatus of the type specified a control system or apparatus comprising means movable to preselect the desired colour and/or intensity of light and further movable to produce such colour and/or intensity. The means movable to preselect the desired colour and/or intensity may comprise the same member that functions to produce such colour and/or intensity or there may be a member movable to preselect and another member to produce the colour and/or intensity; if the same member is used it may

[Price 2/-]

movable in one direction to preselect the required colour and/or intensity by variation of intensity of emission from the light source or sources and/or variation of colour media and in another direction to effect the change to the selected intensity and/or media.

Advantageously, these two movements just mentioned are movements of rotation and displacement (preferably axial displacement) and it is preferred that the rotational movement shall effect the selection and the displacement the intensity change.

The foregoing and other features of the invention are incorporated in the control system or apparatus (in or for colour lighting apparatus of the specified type) which will now be described as an example. The example chosen is one in which the intensity of each of a plurality of light-sources (with each of which is associated a colour medium such as a filter) is varied to produce the desired effect but it will be understood, that the control apparatus to be described may equally well be used for varying the colour medium or media associated with a light source or plurality of light sources or for performing both functions.

The selector consists of a rotatable, and axially-displaceable, member such as a

# PATENT SPECIFICATION



*Inventor:* ROLLO GILLESPIE WILLIAMS. **640.693**

*Date of filing Complete Specification:* March 1, 1946.

*Application Date:* March 3, 1945. *No.* 5350/45.

*Complete Specification Published:* July 26, 1950.

*Index at acceptance:*—Classes 3(i), A(8: 10c); 38(iv), A2b(2: 3); 97(i), J4; and 132(i), B5a.

## PROVISIONAL SPECIFICATION

### New or Improved Control Means for Colour Lighting Apparatus

We, W. J. FURSE & Co., LIMITED, a British Company, of Traffic Street, Nottingham, do hereby declare the nature of this invention to be as follows:—

5 This invention concerns apparatus of the type comprising a light source or plurality of light sources and means for projecting or producing coloured light including white or non-coloured light  
10 and the invention consists in the provision of new or improved control means therefor. Any known or approved means, including in particular the use of filters, may be employed for obtaining the  
15 coloured light.

Means may be provided for varying the intensity of light emitted from the light source or each light source and/or means may be provided for varying the colour medium or media through which the light  
20 passes. It is preferred to employ electric lights and if means are provided for varying the intensity of light emitted such means functions to control the voltage  
25 applied to the light such as by the use of resistances, chokes, dimmers or the like.

One of the objects of the invention is to provide control means for apparatus of the said type which are particularly suitable for stage lighting but it will be  
30 appreciated that the invention is not limited to this specific purpose and may be utilised for other purposes.

The invention provides in or for a  
35 colour lighting apparatus of the type specified a control system or apparatus comprising means movable to preselect the desired colour and/or intensity of light and further movable to produce such  
40 colour and/or intensity. The means movable to preselect the desired colour and/or intensity may comprise the same member that functions to produce such  
45 colour and/or intensity or there may be a member movable to preselect and another member to produce the colour and/or intensity; if the same member is used it may

be movable in different senses.

As viewed from another aspect the invention provides a control system or  
50 apparatus comprising a selector and a transmitter which are relatively movable in one direction to preselect by their relative attitudes, the desired colour and/or intensity and are relatively movable in  
55 another direction to cause the transmitter to transmit the selection and to effect the change (such as change of light intensity and/or colour medium or media) to that  
60 selected. As viewed from a still further aspect the invention provides a control system or apparatus comprising a selector  
65 movable in one direction to preselect the required colour and/or intensity by variation of intensity of emission from the light source or sources and/or variation of  
colour media and in another direction to effect the change to the selected intensity and/or media.

Advantageously, these two movements  
70 just mentioned are movements of rotation and displacement (preferably axial displacement) and it is preferred that the rotational movement shall effect the selection and the displacement the inten-  
75 sity change.

The foregoing and other features of the invention are incorporated in the control system or apparatus (in or for colour lighting apparatus of the specified type)  
80 which will now be described as an example. The example chosen is one in which the intensity of each of a plurality of light sources (with each of which is associated a colour medium such as a  
85 filter) is varied to produce the desired effect but it will be understood, that the control apparatus to be described may equally well be used for varying the colour medium or media associated with a  
90 light source or plurality of light sources or for performing both functions.

The selector consists of a rotatable, and axially - displaceable, member such as a

[Price 2/-]

drum or disc presenting at an end face as many series of selecting elements as there are light sources to be controlled. These series are arranged in concentric circles and each series consists of a circle of elements of contrasting heights each height being appropriate to a certain intensity of light emission from the source, to which the series under consideration is allocated. The elements are further arranged in colour combinations whereof each combination consists of an element of each series, so that the combination is appropriate to such intensities of emission from the light sources as will result, upon mingling, in a predetermined colour; by rotating the selector any required colour combination may be brought to a selection station at which the selecting elements register with transmitting elements hereinafter referred to. The elements of each combination may be located in the same radial plane or in different concentric planes but are preferably staggered.

Each series may consist of pegs or pins of various lengths protruding from the aforesaid end face.

Associated with this selector there is a transmitter consisting of a stationary member presenting towards the selector a set of movable transmitting elements equal in number to the number of series of selecting elements and to the light sources each transmitting element being allocated to the light source to control, by its movement on the transmitter, the intensity of light emission from that source. These transmitting elements are of course located at the same radius from the extended axis of the selector as are the series of selecting elements, and they may consist of slidable pins protruding from the transmitter towards the selector.

Upon rotation of the selector to bring a required colour combination to the selecting station, the selector is moved axially so that the selecting elements are brought into contact with and move, to the required extents, the transmitting elements and these in turn (through suitable connections) vary the intensity of light emission of the light sources, with which they are associated, in accordance with the extent of their movement and the heights of the selector elements in the selected colour combination.

It is an advantage of the foregoing arrangement that after preselection the change can be effected at any desired speed, according to the speed of axial movement of the selector.

It is to be pointed out, however, that intensity variation up and down is required. For this purpose the selector

incorporates, for each colour combination of selecting elements, a complementary combination (i.e. a long selecting pin in a colour combination having its complementary short pin in the complementary combination) and the transmitter incorporates a complementary set of transmitting elements; the complementary transmitting elements in the two sets are so coupled that when one is pushed in the other is moved out. For example, they may be connected by a lever or a cable, chain, or the like passing over a pulley or its equivalent, and movement of this connection in either direction varies a resistance or other voltage control associated with an electric lamp constituting the light source and thereby varies the intensity of light emission.

It will be appreciated that after a change has been effected the selector may be withdrawn from the transmitter ready for a further preselection. Advantageously, an individual intensity control is associated with each light source which may be operated (e.g. manually) when the selector has been withdrawn, to vary the intensity of emission of a source from the value set by the transmitter and thereby to vary the colour from that preselected by the original colour combination of the selector. In general, the operation of such an individual control will result in a resetting of the two complementary transmitting elements.

It is desirable to provide, in association with the selector, a pointer movable over a scale of colours or of numbers indicative of colours so as to afford a visual guide for the preselection. The selector may be moved by hand or by power, or both; in a hand-operated construction it may be provided with one lever or hand wheel for rotating it and with another lever or hand wheel for moving it endwise through the medium of a rack and pinion.

It may here be said that apparatus in accordance with this invention may be actuated automatically if desired. For example the selector may be inched round by electrical means. This may be done by so arranging matters that after a colour change has been made, and when the selector is moved axially away from the transmitter, an electrical contact is made which causes the selector to rotate to another colour, whereupon it is moved axially by electrical means to operate the transmitter and effect another colour change. In other words both rotary movement and axial movement of the selector in either direction may be effected by electrical means. Alternatively movement in one sense may be effected by manual means and movement in the other

sense may be effected electrically. If movement is effected electrically means may be provided for varying the rate of movement. Hydraulic or pneumatic means may also be employed for actuating apparatus in accordance with this invention.

Where a plurality of sets of colour lighting apparatus of the type specified is employed (e.g. at various locations about a stage), each with a control system or apparatus according to this invention, means may be provided for operating all the control systems in unison or individually. One set of control apparatus in accordance with this invention may be used to operate collectively two or more sets of colour lighting equipment and means may be provided whereby each equipment gives the same light or one or more gives one coloured light or lights and one or more gives another coloured light or lights.

It is to be understood that whereas in the foregoing construction both the aforesaid movements are applied to the selector, one of them may be applied to the transmitter. For example, the transmitter may be moved towards the selector to produce the changes, the connections from the transmitter being suitably constructed to permit of this. Moreover, the

selecting elements may be presented at the periphery of a rotatable selector instead of at an end face.

In an alternative method of carrying the invention into effect the elements which in the previously described construction were mounted on the selector are movably mounted on or in a fixed transmitter and the selector is provided with a pair of contacts corresponding to each set of light sources. Upon rotating the selector to a predetermined position and moving it axially towards the transmitter predetermined of said elements are actuated and are moved into contact with members (such as annular rings disposed on that side of the transmitter opposite to the selector) to vary the intensity of light to give the desired colour.

There is of course one pair of rings—suitably linked—for each set of light source and axial movement of these rings actuates the dimmers or the like.

In the specification the expression "colour light" and similar expressions, where the context so permits, mean and include white or non-coloured light and intensity of light.

Dated this 2nd day of March, 1945.

ERIC POTTER & CLARKSON,  
Chartered Patent Agents,  
Eleven, Park Row, Nottingham.

## COMPLETE SPECIFICATION

### New or Improved Control Means for Colour Lighting Apparatus

We, W. J. FURSE & Co., LIMITED, a British Company, of Traffic Street, Nottingham, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described, and ascertained in and by the following statement:—

This invention concerns apparatus of the type comprising a light source or plurality of light sources and means for projecting or producing coloured light (including white or non-coloured light) and the invention has for its principal object the provision of new or improved control means therefor. Any known or improved means including in particular the use of filters, may be employed for obtaining the coloured light.

Means may be provided for varying the intensity of light emitted from the light source or each light source and/or means may be provided for varying the colour medium or media through which the light passes. In varying the intensity of light emitted, that is to say the intensity of the utilisable emitted light, the intensity of the light source itself may be varied or

the intensity of the source may remain constant and the intensity of the emitted light may be varied, such as by means of a mask, or the two different methods may be used in combination. It is preferred to employ electric lights and if the intensity of emitted light is varied by varying the intensity of the light source itself the means for varying such intensity may function to control the voltage applied to the light such as by the use of resistances, chokes, dimmers or the like.

A specific object of the invention is to provide control means for apparatus of the said type which are particularly suitable for stage lighting but it will be appreciated that the invention is not limited to this specific purpose and may be utilised for other purposes.

The invention provides in or for a colour lighting apparatus of the type specified a control system or apparatus comprising means associated with the or each light source for modifying the intensity and/or colour of the light projected, and a two-motion selector one motion of which preselects the desired colour and/or

intensity and the other motion of which effects displacement of said modifying means through a transmitter having means variably displaceable by said other motion of the selector to transmit corresponding displacement of said modifying means and thereby effect the colour and/or intensity modification.

As viewed from another aspect, the invention provides a control system or apparatus for colour light apparatus of the type stated, comprising means associated with the or each light source for modifying the intensity and/or colour of the light projected, a selector, and a transmitter having means displaceable by the selector for variably displacing said modifying means, the selector and the transmitter being relatively movable in one locus to preselect the desired colour and/or intensity and in another locus to cause the displaceable means to transmit corresponding displacement to said modifying means and thereby effect the colour and/or intensity modification.

Advantageously these two movements just mentioned are movements of rotation (i.e. in a plane transverse to the axis of rotation) and displacement, preferably axial displacement (i.e. in a plane of the axis) and it is preferred that the rotational movement shall effect the selection and the displacement the change of intensity or other modification.

The aforesaid displaceable means may comprise in association with each light source a couple of members interconnected to be movable by complementary displacements to effect modification of the light projected from the associated source, and means for simultaneously moving said couples of members. There may be provided manual means for actuating the selector, and manual means for imparting relative movement between said selector, and said couples of member which function to vary simultaneously the intensity and/or colour of the plurality of lights.

The rate of change of colour and/or intensity can be varied at will and a specific feature of the invention consists in the provision of means for manually adjusting each or selected of the plurality of lights and/or colours after or before any desired combination thereof has been selected.

The invention further provides apparatus as aforesaid having the selector automatically actuable to operate said modifying means according to a predetermined sequence for simultaneously varying the colour and/or intensity of the light projected from the or each source.

Apparatus according to this invention has numerous applications. It may, as

already stated, be used for stage lighting (including cinema lighting) and may be used for decorative work and display purposes and shop window lighting. When used for stage lighting it is capable of reproducing any standard shade at will whilst furthermore, any of such shades will be readily varied at will to suit particular tastes; this is an important asset. When used for display purposes or shop window lighting any desired cycle of light changes can be produced and the apparatus will produce such cycle for any desired or predetermined period.

The foregoing and other features of the invention set out in the appended claims are incorporated in the control system or apparatus (in or for colour lighting apparatus of the specified type) which will now be described as an example, with reference to the accompanying drawings in which Figure 1 is a perspective view of the apparatus;

Figure 2 is a sectional elevation thereof;

Figure 3 is a front elevation;

Figure 4 is a section on the line A—A, and

Figure 5 is a section on the line B—B in Fig. 2;

Figure 6 is a section through one of the transmitters;

Figure 7 illustrates the operator's indicator panel;

Figures 8 and 9 illustrate actuating mechanism for the foregoing apparatus.

The example chosen is one in which the intensity of each of a plurality of light sources (with each or selected of which is associated a colour medium such as a filter) is varied to produce the desired effect.

The selector consists of a rotatable and axially-displaceable member such as a drum or disc 1 presenting at an end face as many series of selecting elements 2 as there are light sources to be controlled. These series are arranged in concentric circles and each series consists of a circle of elements 2 of contrasting heights, each height being appropriate to a certain intensity of light emission from the source to which the series under consideration is allocated. The elements 2 are further arranged in colour combinations whereof each combination consists of an element of each series, so that the combination is appropriate to such intensities of emission from the light sources as will result, upon mingling, in a predetermined colour; by moving the selector in one locus, i.e., by rotating it, any required colour combination may be brought to a selection station or stations at which the selecting elements 2 register with transmitting elements hereinafter referred to. The elements of

each combination may be located in the same radial plane in which the axis of rotation lies, but may be staggered.

Each series may consist of pegs or pins of various lengths protruding from the aforesaid end face. As shown in the drawings, the pegs or pins 2 are adjustable for length of protrusion (being screwed through the disc 1 and provided with lock nuts) so that the colour combination may be pre-set as required.

Associated with this selector there is a transmitter consisting of a stationary member presenting towards the selector a set of movable transmitting elements 3 equal in number to the number of series of selecting elements operable on the transmitter and equal to the number of light sources, each transmitting element being allocated to a light source to control, by its movement in the transmitter, the intensity of light emission from that source. These transmitting elements 3 are of course located at the same radius from the extended axis of the selector as are the series of selecting elements 2, and they may consist of slidable pins protruding from the transmitter towards the selector.

After rotation of the selector 1 to bring a required colour combination to the selecting station, the selector is moved in another locus, i.e., axially so that the selecting elements 2 are brought into contact with and move, to the required extents, the transmitting elements 3 and these in turn (through suitable connections) vary the intensity of light emission of the light sources, with which they are associated, in accordance with the extent of their movement and the heights (i.e. the protrusion from disc 1) of the selector elements in the selected colour combination.

It is an advantage of the foregoing arrangement that after preselection the change can be effected at any desired speed, according to the speed of axial movement of the selector.

It is to be pointed out, however, that intensity variation up and down is required. For this purpose the selector incorporates, for each colour combination of selecting elements, a complementary combination (i.e. a long selecting pin in a colour combination having its complementary short pin in the complementary combination) and the transmitter incorporates a complementary set of transmitting elements; the complementary transmitting elements in the two sets are so coupled that when one is pushed in the other is moved out. For example, they may be connected by a lever, or by a cable, chain, or the like passing over a pulley

or its equivalent, and movement of this connection in either direction varies a resistance or other voltage control associated with an electric lamp constituting the light source and thereby varies the intensity of light emission.

Specifically, the construction illustrated, is arranged to control four light sources of primary colours. Therefore four series of selecting elements 2 are provided which may conveniently be distinguished by the letters A, B, C and D, the associated selector elements being numbered 2a, 2b, 2c, 2d. The arrangement may be such that any colour combination requires the presentation of the appropriate group or combination of their elements to a single transmitter, but the introduction of complementary selector elements (numbered 2'a, 2'b, 2'c and 2'd) renders it desirable to locate the elements of two series over one part of the circle, with the elements of the other two series over the other part of the circle, and to employ a transmitter which in effect consists of two spaced transmitters one of which is appropriated to two series and the other of which is appropriated to the other two series. Thus there is an upper transmitter A<sup>1</sup> B<sup>1</sup> controlling two light sources and operated on by selector elements 2a, 2b, 2'a, 2'b of series A and B located over one half of the circumference of disc 1 and a lower transmitter C<sup>1</sup> D<sup>1</sup> controlling the other two light sources and operated on by selector elements 2c, 2d, 2'c, 2'd located over the other half of the circumference of disc 1. Each colour combination comprises elements 2a, 2b and diametrically opposed elements 2c, 2d, and any given position of disc 1 results in the simultaneous presentation to the two transmitters A<sup>1</sup> B<sup>1</sup> and C<sup>1</sup> D<sup>1</sup>, of the requisite four elements and their complementary elements.

The two transmitters are substantially identical. The elements 3 of the upper transmitter A<sup>1</sup> B<sup>1</sup> comprise element 3a and its complementary element 3'a of one light source, and element 3b and complementary element 3'b of a second light source. Likewise the elements 3 of the lower transmitter C<sup>1</sup> D<sup>1</sup> comprise element 3c and complementary element 3'c of a third light source, and element 3d and complementary element 3'd of the fourth light source.

A representative transmitter is shown in Fig. 6 wherein the transmitting elements and the complementary elements are racks. Elements 3a and 3'a mesh with opposite sides of a pinion 4a on shaft 5a, protruding from one side of the transmitter A<sup>1</sup> B<sup>1</sup>, and elements 3b, 3'b with a like pinion 4b on shaft 5b protruding

from the other side thereof. For the other transmitter C<sup>1</sup> D<sup>1</sup> elements 3c, 3'c mesh with corresponding pinion 4c on shaft 5c and elements 3d, 3'd with pinion 4d on shaft 5d. The rotation thus imparted to these four shafts by the advance of disc 1 serves to transmit the selection afforded by the prior rotation of said disc so as to produce the required light change; in the illustrated construction it serves to vary four dimmers or resistances 6a-6d associated one with each of four light sources of differing primary colours so that any desired colour mixture may be obtained (each resistance being adjustable by means of a contact arm such as 7 to vary the intensity of illumination from the associated source between nothing and a maximum value).

It will be appreciated that after a change has been effected the selector 1 may be withdrawn from the transmitter ready for a further preselection. Advantageously, an individual intensity control is associated with each light source which may be operated (e.g. manually) when the selector has been withdrawn, to vary the intensity of emission of a source from the value set by the transmitter and thereby to vary the colour from that preselected by the original colour combination of the selector. Such manually operable, individual intensity controls are indicated at 8a, 8b, 8c and 8d. In general, the operation of such an individual control will result in a re-setting of the two complementary transmitting elements by rotating the associated shaft 5a-5d through suitable connections.

It is desirable to provide, in association with the selector 1, a pointer 9 movable over a scale 10 of colours or of numbers indicative of colours so as to afford a visual guide for the preselection. The selector may be moved by hand.

In the hand operated construction shown in Figs. 1 to 6 the selector 1 is slidably mounted on a shaft 11 to which the pointer 9 is attached and is rotatable by said pointer and shaft through the medium of key arm 12. The selector further carries a sleeve 13 cut with parallel teeth that mesh in any position of rotation of the disc 1 with a quadrant 14 on shaft 18 movable by a hand lever 15 against the action of spring 28. Thus rotation of the pointer 9 serves to set the selector and movement of the hand lever 15 serves to advance the selector towards the transmitters to carry the required selection into effect. It will be seen that the speed at which the change-over from the old selection to the new selection is effected, is governed solely by the speed at which the hand lever 15 is moved, so

that a gradual fade-in and fade-out may be produced, and this is an important advantage.

The pointer 9 is conveniently provided with a spring-pressed releasable plunger 16 arranged to be received in any selected one of a series of holes 17 associated with the scale 10.

It may be said that apparatus in accordance with this invention may be actuated automatically if desired. For example, the selector may be inched round by electrical means. This may be done by so arranging matters that after a colour change has been made and when the selector is moved axially away from the transmitter, an electrical contact is made which causes the selector to rotate to another colour, whereupon it is moved axially by electrical means to operate the transmitter and effect another colour change. In other words both rotary movement and axial movement of the selector in either direction may be effected by electrical means.

One method by which apparatus according to this invention may be actuated automatically is illustrated in Figs. 8 and 9. There is an electric motor 19 adapted to rotate a spindle 20 which imparts rotary motion to an arm 21 mounted radially thereon. The free end of this arm 21 is pivotally connected to one end of a link 22 the other end of which is connected, also pivotally, to an arm extending radially from the aforementioned shaft 18. This arm may be the hand lever 15 before mentioned, if desired. From this arrangement it will be seen that when the motor 19 is in operation, reciprocating motion is imparted automatically to the selector 1.

In order to rack the selector 1 round automatically there is provided a clawker 23 freely pivoted to a vertical slide 24. The slide is raised when the arm 15 is raised to withdraw the selector 1 by the engagement of a projection 25 (on the aforesaid arm 15) with a projection 26 on the slide 24. In the lowered position of the slide 24 the selector 1 is forward in engagement with the transmitter, and the clawker 23 is in an inoperative position as shown. As the slide 24 is raised when the selector is withdrawn the clawker is guided into an operative position by a fixed peg 27, which, when the clawker is in the inoperative position as shown, is received in a recess formed in the rear face of the clawker. In this position the clawker is in engagement with the tail of one of the aforementioned pins 2 and further upward movement of the slide causes the clawker to rack the selector 1 round.



Suitable stops 28 may be provided to determine the downward or disengaged position of the clawker while adjusting means 29 may be fitted to ensure that the clawker engages the selector pin 2 at the correct time and position. The slide and clawker may be lowered by their own weight or a return spring may be fitted.

Where a plurality of sets of colour lighting apparatus of the type specified are employed (e.g. at various locations about a stage) each with a control system or apparatus according to this invention, means may be provided for operating all the control systems in unison or individually. One set of control apparatus in accordance with this invention may be used to operate collectively two or more sets of colour lighting equipment and means may be provided whereby each equipment gives the same light or one or more gives one coloured light or lights and one or more gives another coloured light or lights. As the pointer is rotated the disc is similarly rotated and associated with the panel is a member such as a lever 15 which when actuated imparts axial movement to the disc to advance it towards or withdraw it from the transmitter to vary the lights in manner described. The pointer and lever are coupled to the selector by electrical, mechanical, hydraulic or other means.

It is to be understood that whereas in the foregoing construction both the aforesaid movements are applied to the selector, one of them may be applied to the transmitter. For example, the transmitter may be moved towards the selector to produce the changes, the connections from the transmitter being suitably constructed to permit of this. Moreover, the selecting elements may be presented at the periphery of a rotatable selector instead of at an end-face.

In an alternative method of carrying the invention into effect the elements which in the previously described construction were mounted on the selector are movably mounted on or in a fixed framework and the selector which may be in the form of a rotatable arm is provided with a contact (or a pair of contacts if complementary elements are employed) corresponding to each set of light sources or colours. Upon the selector being rotated to a predetermined position and thereafter being moved axially towards the framework predetermined of said elements are actuated and are moved into contact with members (such as annular rings disposed on that side of the framework opposite to the selector) to vary the intensity of light to give the desired colour.

There is one ring for each light source or each colour or a pair of rings, suitably linked, if complementary elements are employed, and the rings are moved axially by the elements to an extent determined by the length of the elements to vary the intensity and/or colour of the light emitted such as by actuating dimmers or by other suitable means.

It may be said that in carrying the invention into effect each light source preferably, but not necessarily, comprises a plurality of lights; if for example there are four light sources including one for white light and three different coloured lights there may be (in one embodiment which is now referred to by way of example only) two or more separate lamps and reflectors for the white light and two or more separate lamps, reflectors and coloured screens for each colour; the screens for each colour may be identical with one another in colour or otherwise as desired and the number of lamps and reflectors for each colour (including white light) may be the same or different as desired. In controlling the light sources in accordance with the invention it will be appreciated that when any light source is varied all the lamps comprising that source are varied simultaneously and to the same extent.

In conclusion it may be said that the disc with selector elements thereon or the framework with associated elements may be so mounted in the apparatus that it can readily be replaced by another disc or framework having differently arranged elements whereby different colours and/or sequences can readily be obtained.

In the specification, the expression "colour light" and similar expressions, where the context so permits, mean and include white or non-coloured light and intensity of light.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. For a colour lighting apparatus of the type specified, a control system or apparatus comprising means associated with the or each light source for modifying the intensity and/or colour of the light projected, and a two-motion selector one motion of which preselects the desired colour and/or intensity and the other motion of which effects displacement of said modifying means through a transmitter having means variably displaceable by said other motion of the selector to transmit corresponding displacement to said modifying means and thereby effect the colour and/or intensity modification.



2. A control system or apparatus for colour lighting apparatus of the type stated, comprising means associated with the or each light source for modifying the intensity and/or colour of the light projected, a selector, and a transmitter having means displaceable by the selector for variably displacing said modifying means, the selector and the transmitter being relatively movable in one locus to preselect the desired colour and/or intensity and in another locus to cause the displaceable means to transmit corresponding displacement to said modifying means and thereby effect the colour and/or intensity modification.

3. A system or apparatus according to Claim 1 or 2, wherein the two movements are movements of rotation and displacement.

4. A system or apparatus according to Claim 3, wherein the rotational movement effects the selection and the displacement effects the modification.

5. A system or apparatus according to Claim 1 or 2, wherein said displaceable means comprises in association with each light source a couple of members interconnected to be movable by complementary displacements to effect modification of the light projected from the associated source, and means for simultaneously moving said couples of members.

6. Apparatus according to Claim 5, having manual means for actuating the selector, and manual means for imparting relative movement between said selector and said couples of members which function to vary simultaneously the intensity and/or colour of the plurality of lights.

7. Apparatus according to any preceding claim, having the selector automatically actuable to operate said modifying means according to a predetermined sequence for simultaneously varying the colour and/or intensity of the light projected from the or each source.

8. A control system or apparatus according to Claim 1 or 2, wherein the selector has a plurality of elements engageable individually under the preselective relative movement with the displaceable means of the transmitter, and preset each to effect a different displacement of said means under the other relative movement.

9. Apparatus according to any preceding claim, wherein the speed at which a modification is effected is variable by varying the speed of relative movement of the selector and the transmitter.

10. Apparatus according to any preceding claim, wherein the selector comprises a series of contrasting selector elements

for each light source or emission and affords a multiplicity of combinations each consisting of an element of each series.

11. Apparatus according to Claim 10, wherein the transmitter comprises a plurality of transmitting elements respectively allocated each to one of the sources or emissions and operable by selecting elements of the respective series.

12. Apparatus according to Claim 11, wherein the transmitter comprising a complementary element for each transmitting element and means coupling each pair of elements together to give a push-pull action, and wherein the selector comprises, for each selector element, a complementary element operable on the associated complementary element of the transmitter.

13. Apparatus according to any of the preceding claims, having additional means for effecting individual adjustment of each light source or emission, or selected thereof.

14. Apparatus according to Claim 12, as modified by Claim 13, having said additional means operable to adjust the setting of each pair of transmitting elements.

15. Apparatus according to Claim 1, 2 or 8, or according to any of said claims as modified by any of Claims 9-14, having the selector and the transmitter separable to an inoperative position permitting relative mutual displacement to prepare a fresh selection.

16. A system or apparatus according to Claim 1, wherein the intensity of each of a plurality of different coloured emissions is variable, comprising means associated with each emission for modifying the intensity thereof and a transmitter having means displaceable for variably displacing said modifying means, the selector having a plurality, one for each colour emission, of series of elements disposed in groups comprising at least one of each series, the elements of each group being preset to effect corresponding displacements of said displaceable means, and the selector being movable relative to the transmitter to present different combinations of said groups of elements to said displaceable means.

17. Apparatus according to Claim 1, for the control of colour lighting apparatus of a type comprising a plurality of light sources giving differently coloured light emissions, comprising a dimmer for each light source for controlling the intensity of light emission from each source, adjusting means for adjusting said dimmers, a transmitter having means displaceable for variably displacing said

adjusting means, series of preset elements on the selector engageable selectively with said displaceable means for effecting predetermined displacements thereof, and means for effecting relative displacements of the selector and transmitter to select combinations of said elements for engagement with said displaceable means.

18. Apparatus according to any preceding claim, having a framework supporting a plurality of movable elements, certain of said elements being of contrasting sizes, the selector being movable to engage and actuate selected of said elements, and the selected elements upon actuation functioning to impart movement proportionate to their size to said modifying means.

19. Apparatus according to Claim 18, in which the elements actuate rings to move same axially and said rings control the emitted light such as through the instrumentality of dimmers.

20. Apparatus according to Claim 18, in which each element comprises a pair of complementary members which are movable axially by the selector to impart

axial movement to a pair of coupled rings which function to control a light source.

21. Apparatus according to any preceding claim, wherein the selector is rotatable to preselect the desired combination and further movable axially to produce the modification.

22. Apparatus according to any preceding claim, wherein the selector is movable from an inoperative position to an operative position to produce the modification and movable when in the inoperative position to effect the preselection.

23. Apparatus for the control of colour lighting, substantially as hereinbefore described with reference to Figures 1-6 of the accompanying drawings.

24. Apparatus according to Claim 23, modified for electrical actuation by means substantially as described with reference to Figures 8 and 9 of the accompanying drawings.

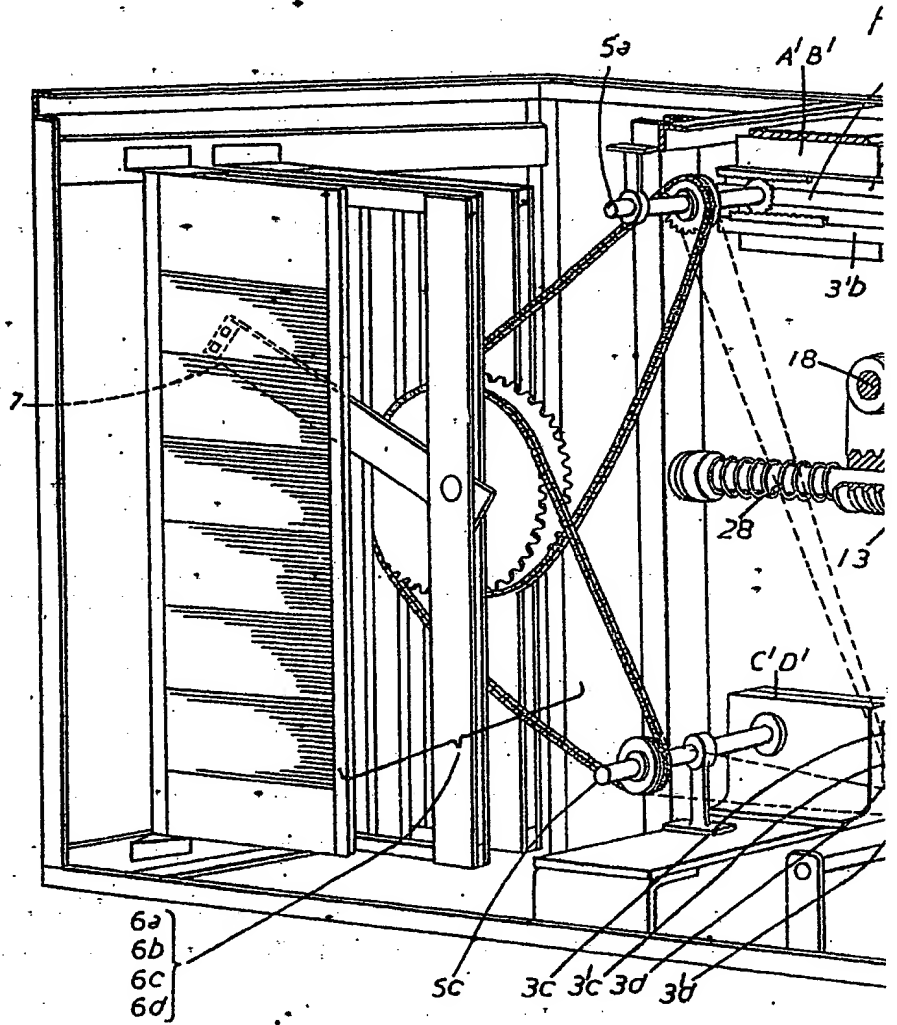
Dated this 28th day of February, 1946.

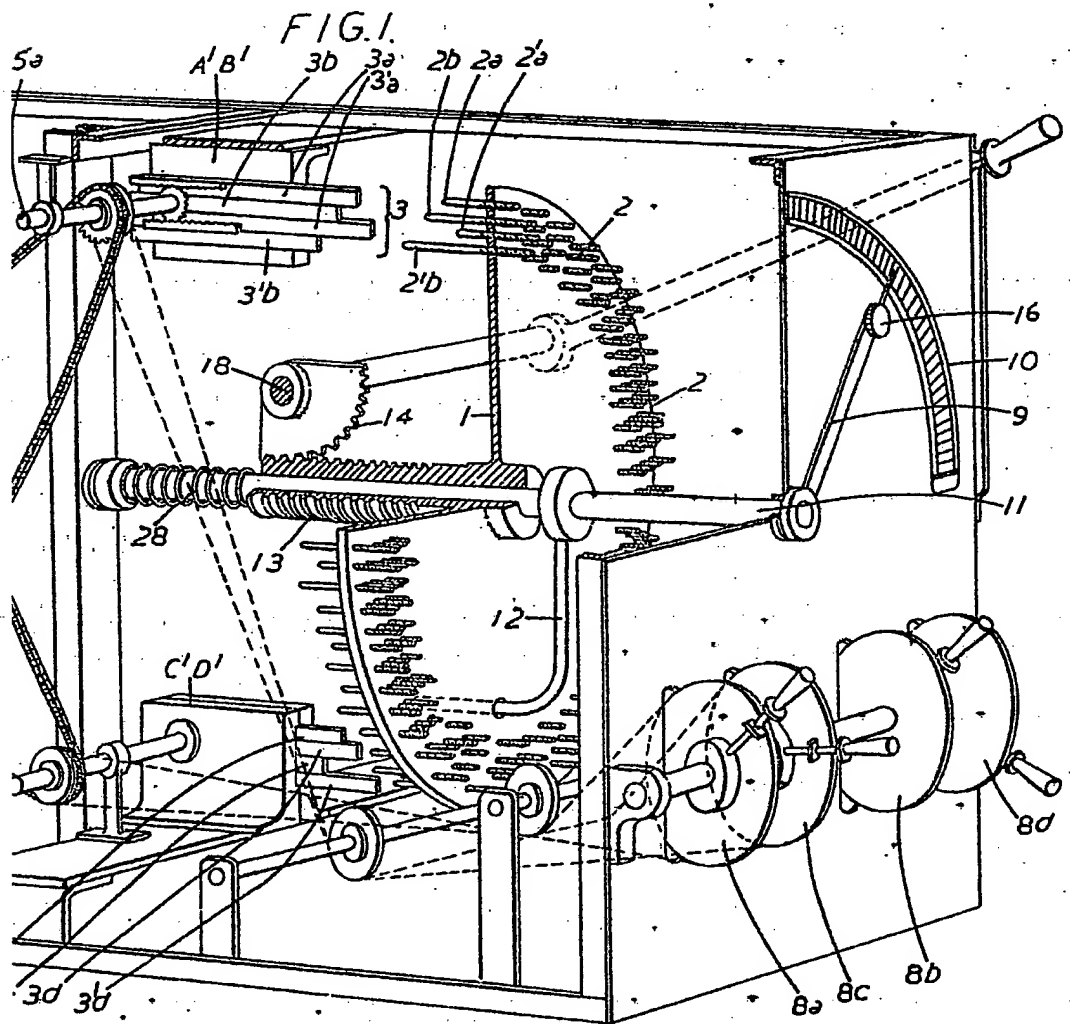
ERIC POTTER & CLARKSON,  
Chartered Patent Agents,  
Nottingham, Leicester and London.

Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1950.  
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2, from which  
copies, price 2s 0d. each (inland) 2s. 1d. (abroad) may be obtained.

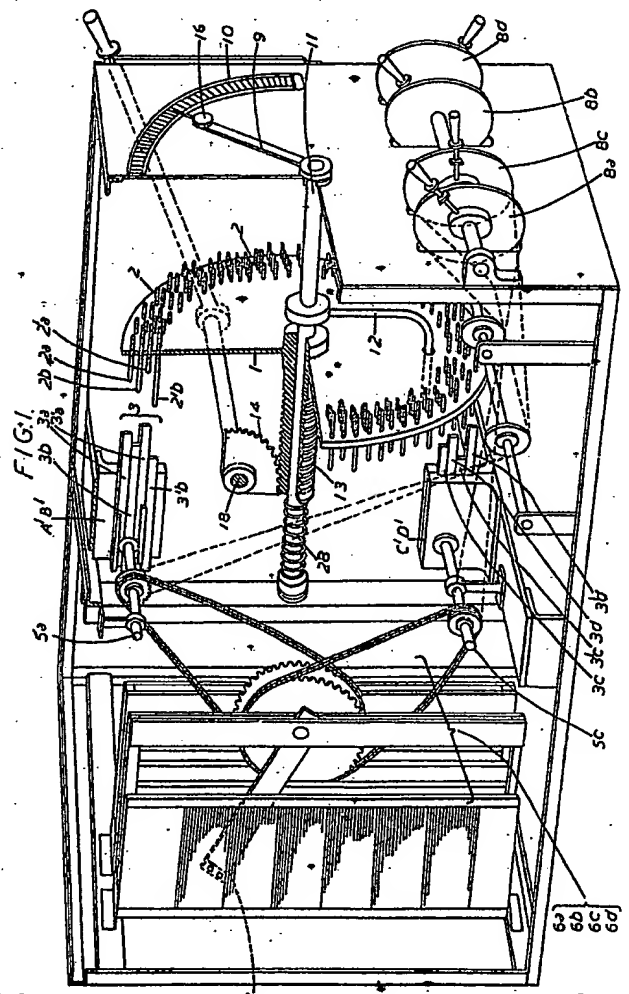
640,693 COMPLETE SPECIFICATION

[This Drawing is a reproduction of the Original on a reduced scale.]



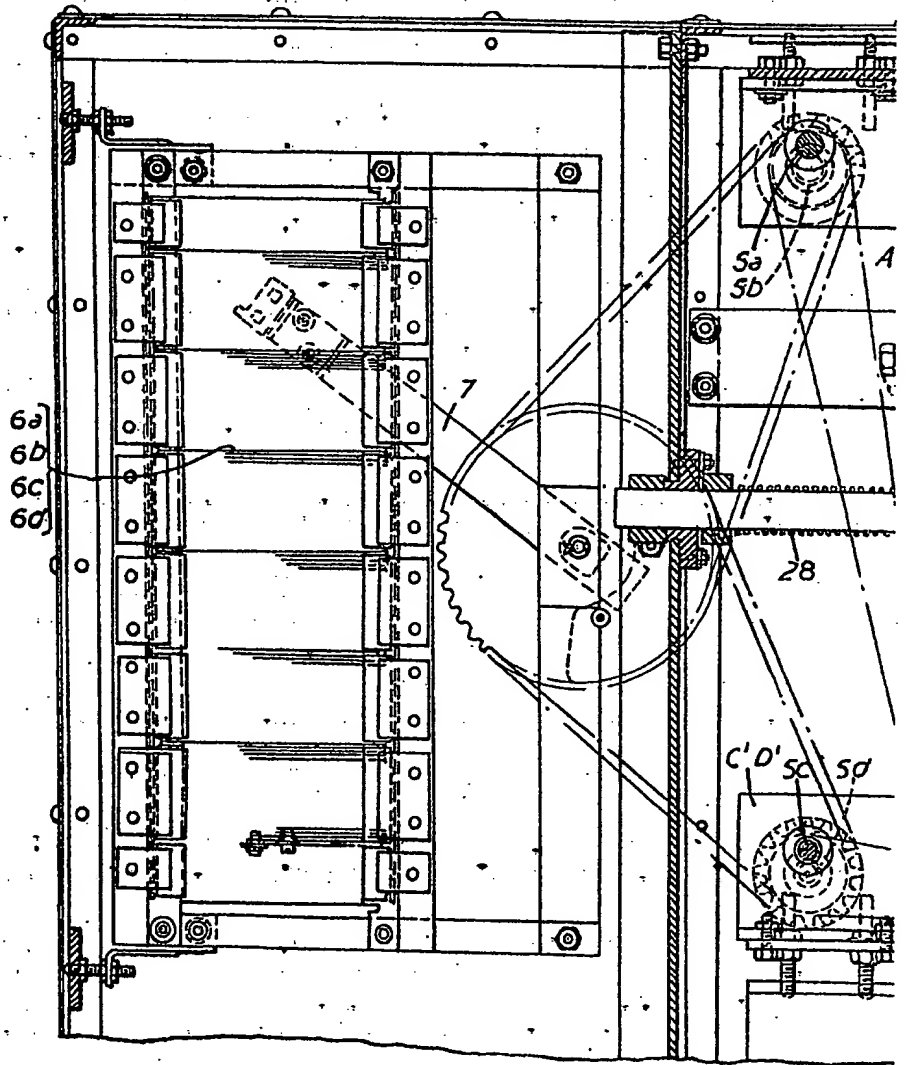


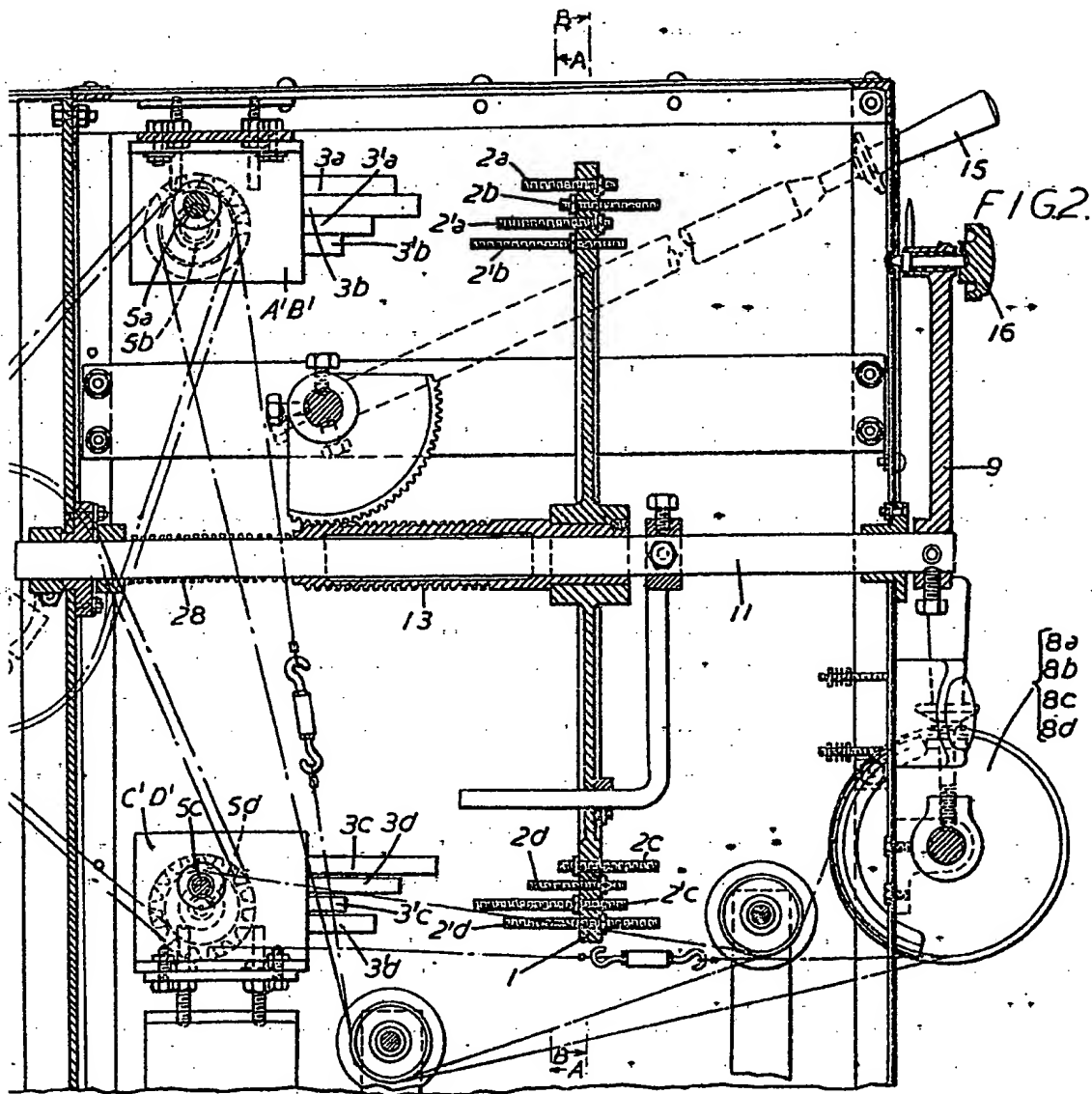
[This Drawing is a reproduction of the Original on a reduced scale]



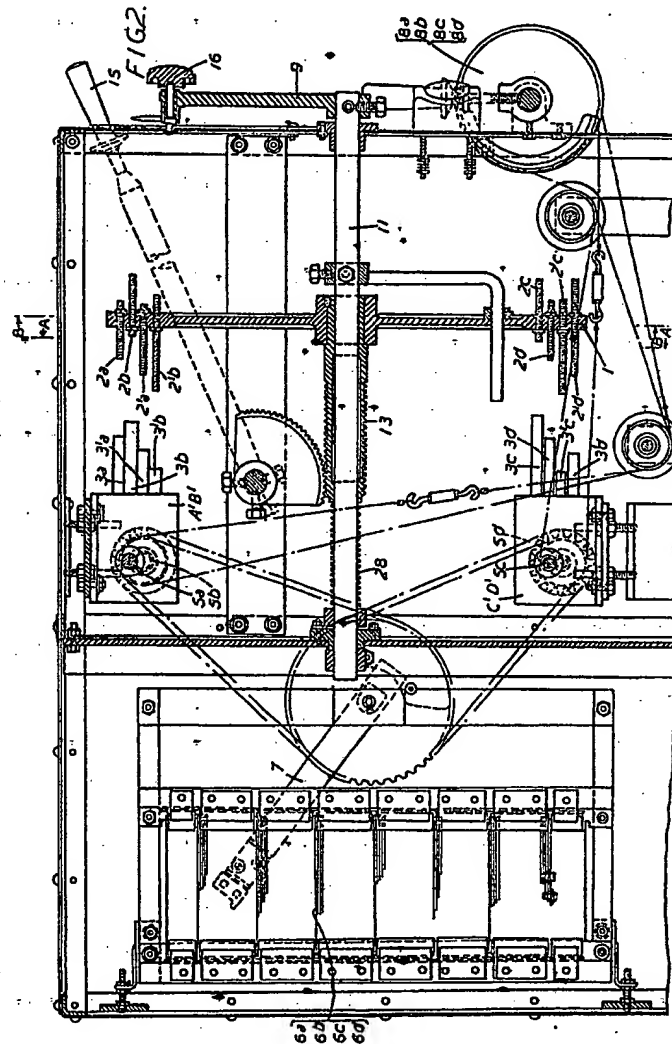
640,693 COMPLETE SPECIFICATION

*[This Drawing is a reproduction of the Original on a reduced scale.]*



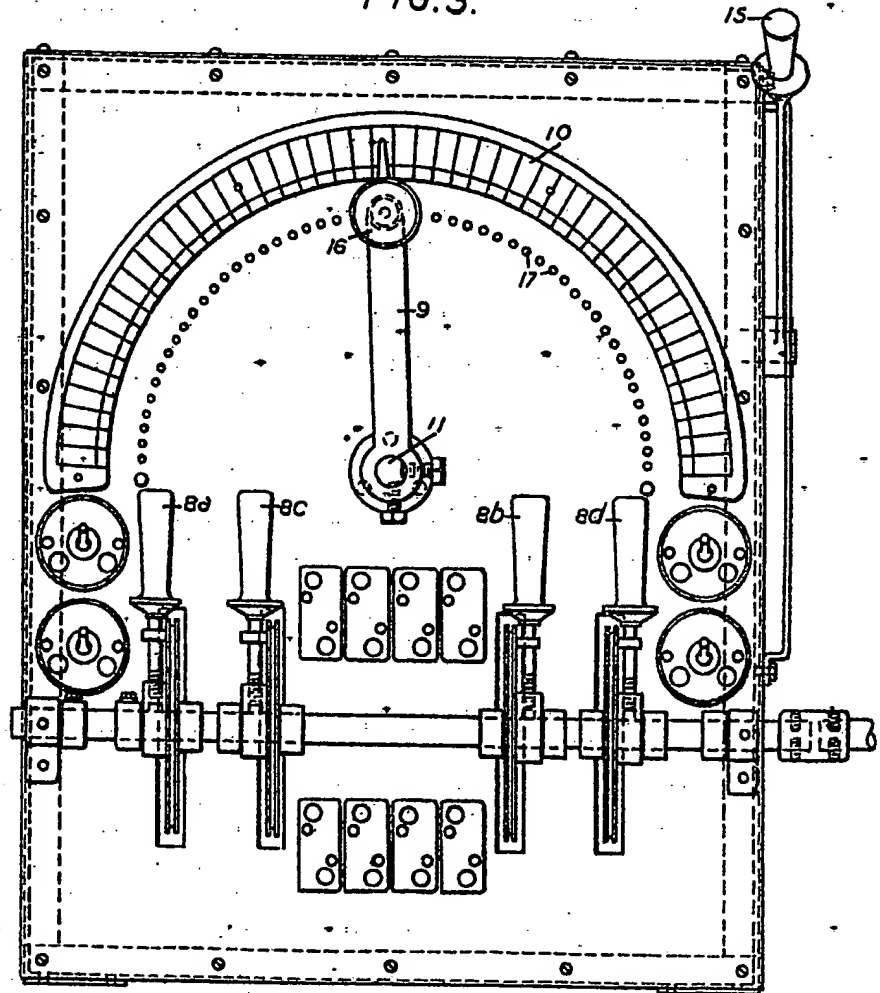






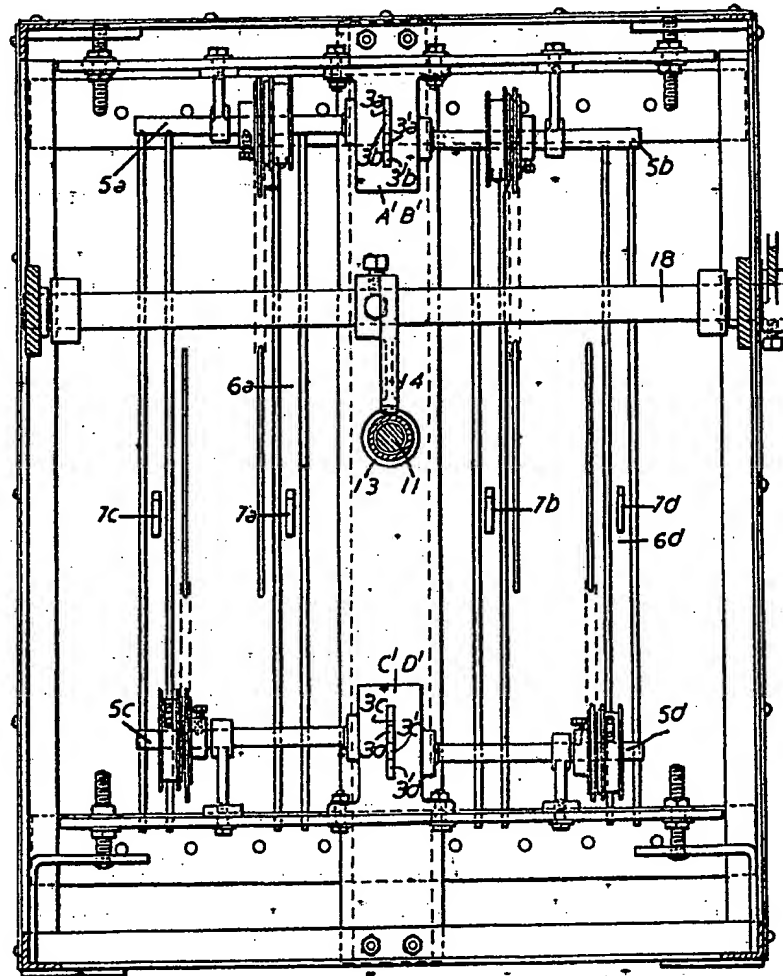
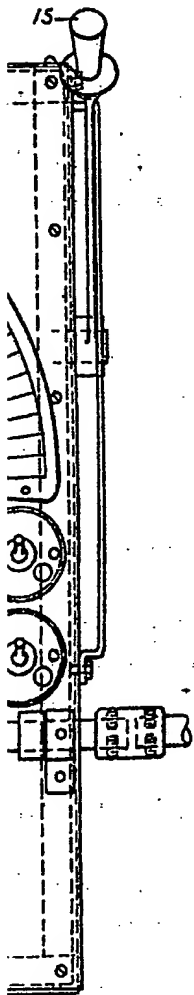
[This Drawing is a reproduction of the Original on a reduced scale.]

FIG. 3.



[This Drawing is a reproduction of the Original on a reduced scale.]

FIG. 4.



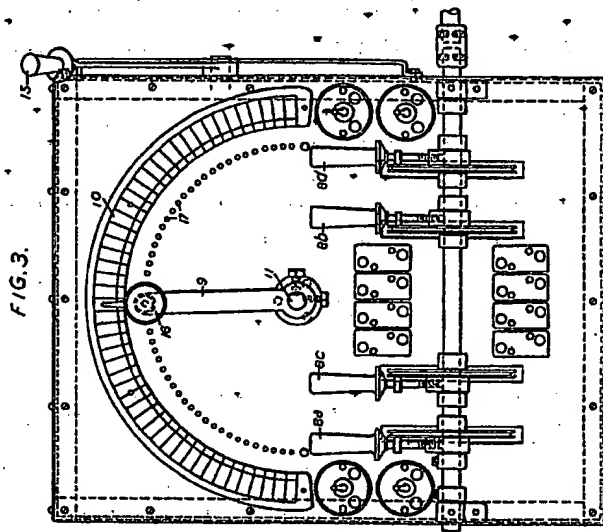


FIG. 3.

[This Drawing is a reproduction of the Original on a reduced scale.]

FIG. 4.

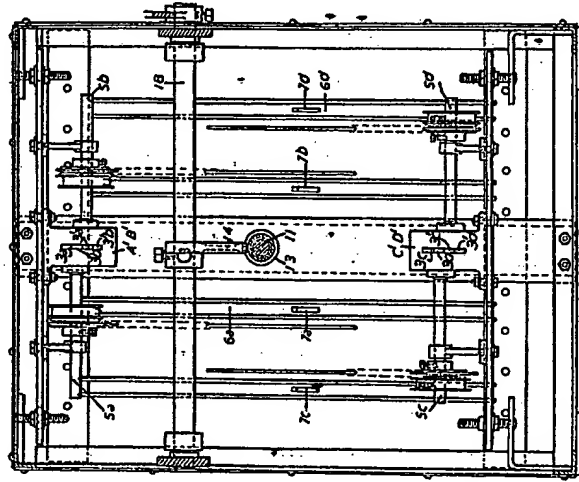
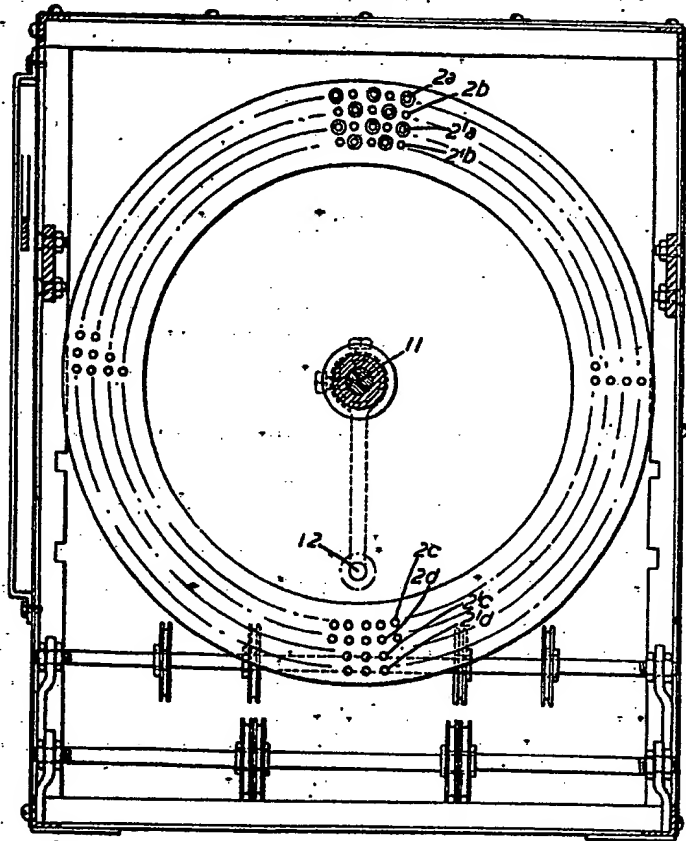
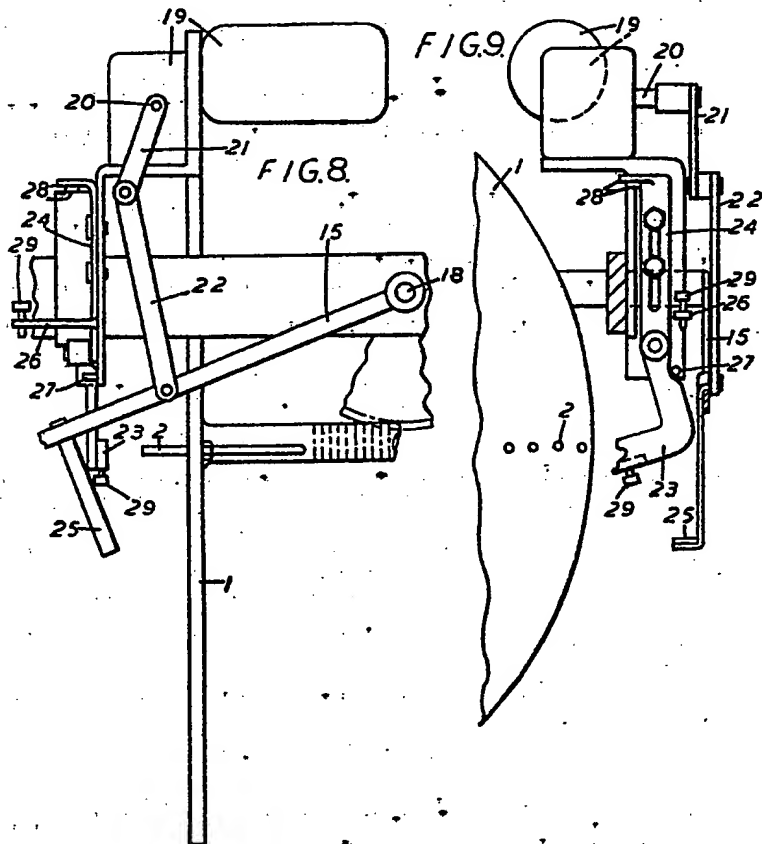
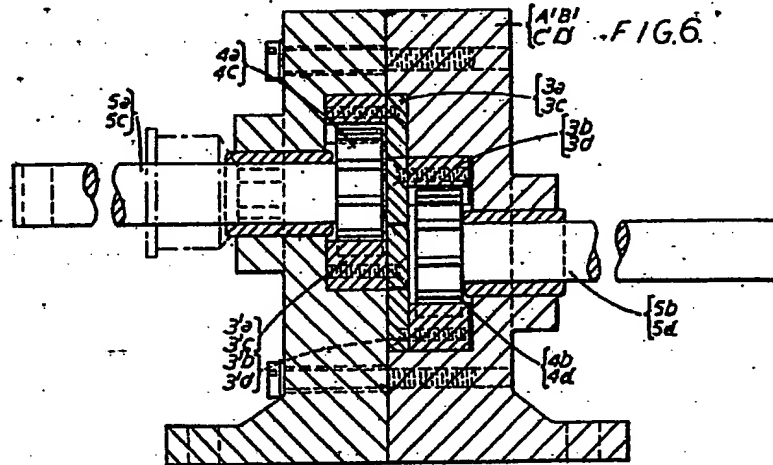


FIG. 5.



[This Drawing is a reproduction of the Original on a reduced scale.]



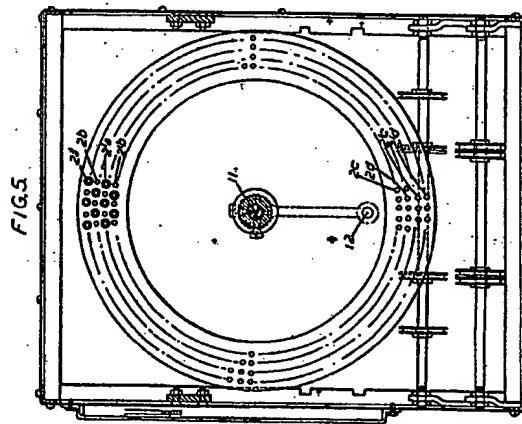


FIG. 5

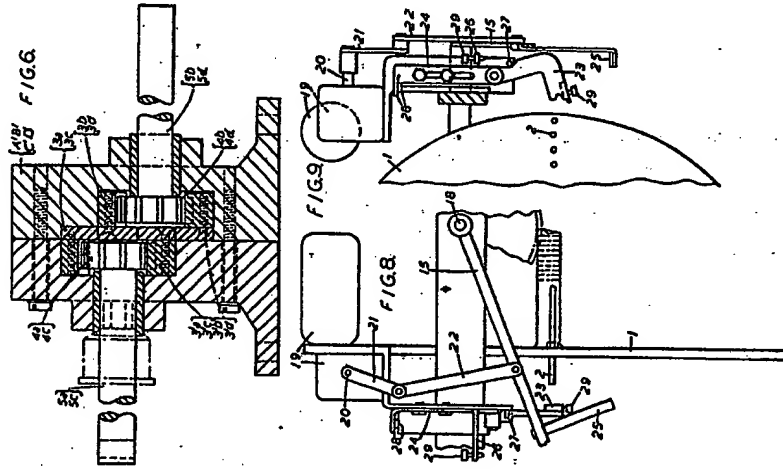


FIG. 6

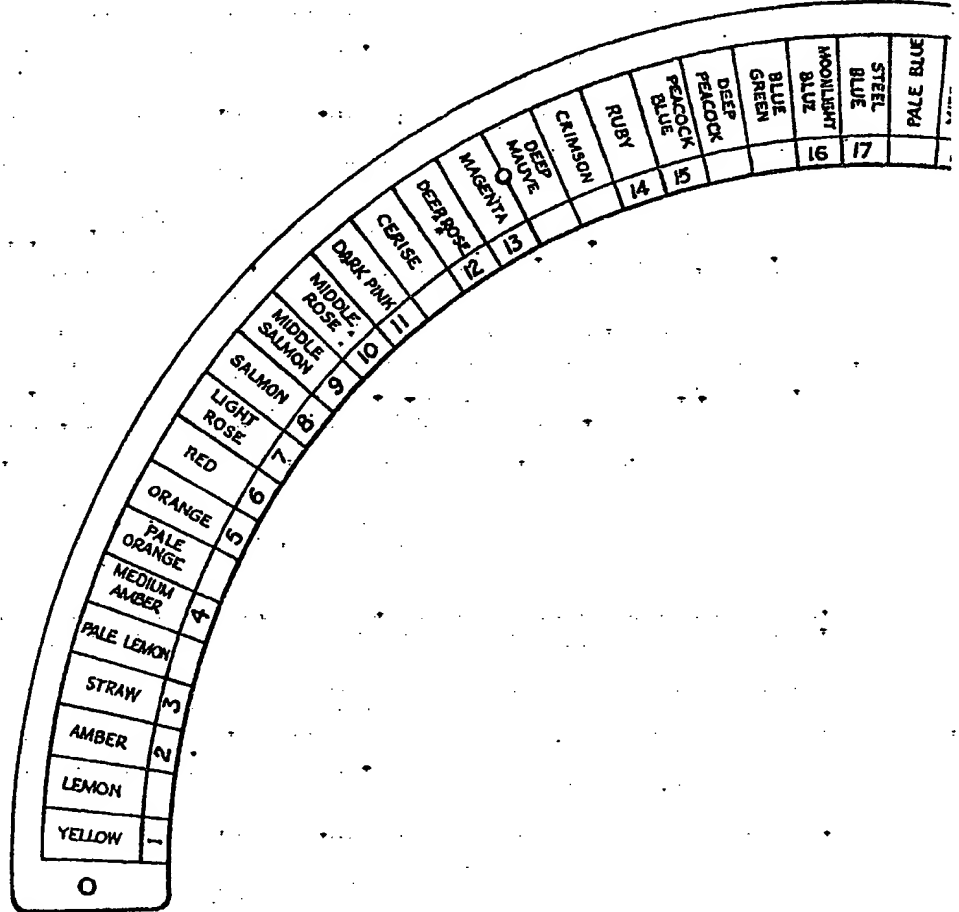
FIG. 7

FIG. 8

FIG. 9



FIG.7



[This Drawing is a reproduction of the Original on a reduced scale.]

FIG. 7

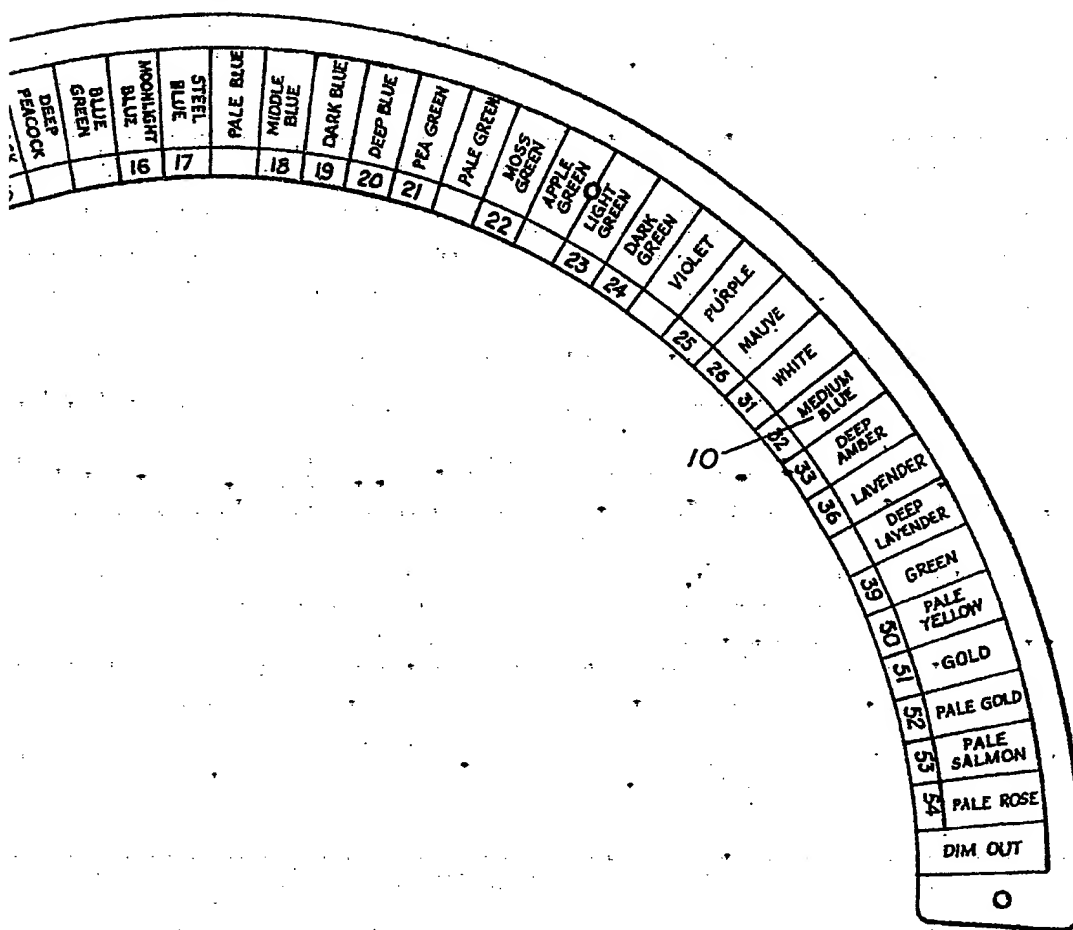
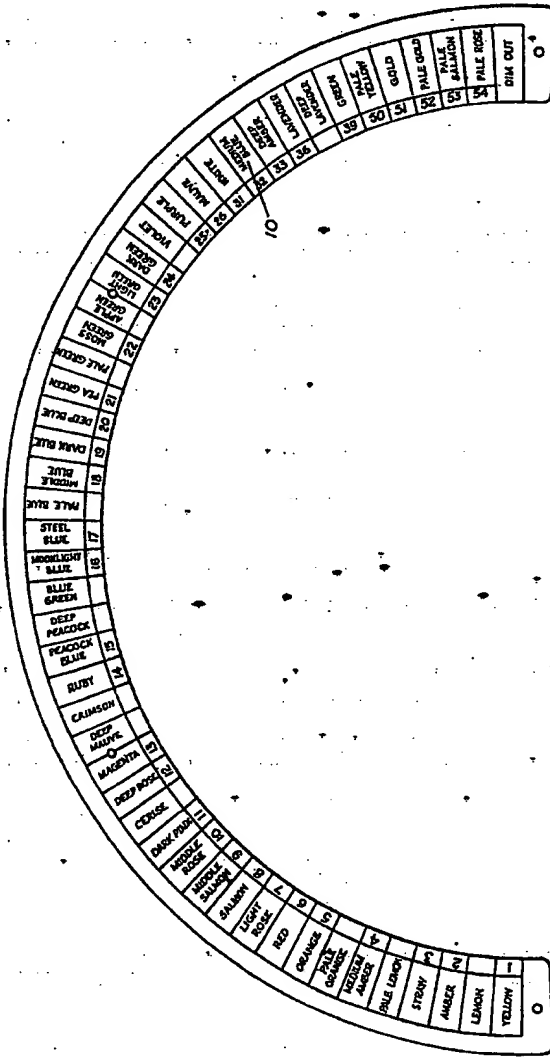


FIG. 7



**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

**BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☒ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**